

SOME HINTS ON TECHNIQUE FOR THE 16MM MOVIE MAKER //

BY

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Every owner of a movie camera using "sub-standard" film (film smaller than the standard 35 mm), should study the book of instructions which comes with his outfit. Some of these books are excellent and go into great detail in advising the beginner in the loading, handling, and care of his camera.

The technique of the professional is the best guide for the amateur movie maker. The professional owes his position and standing to years of study and experience, so you may safely turn to him for guidance. The next time you go to the movies, try to divide your attention between interest in the story and the manner in which the scenes have been photographed. Camera angles, composition, and lighting are the most important points to watch. You will note first that when the professional cinematographer sets up his camera and focuses it upon a scene, he considers the limits of his finder as the frame of a picture. Within this frame he carefully composes the picture for balance and interest. He does more than just point the camera and shoot. He takes time to study that little rectangle in which his scene appears, then makes sure that it includes within its limits an artistic and balanced arrangement of the details, so that on the screen the result will be a "picture." First, he studies his subject in relation to its surroundings and chooses the angle from which it can best be shown. Then he sets up his camera at the exact distance which will enable him to include in the scene just what he wants to show, with the background which will enhance its interest or bring

ARTICLE
ORIGINAL COMMUNICATION
The Professional and the Layman
J. H. HARRIS, M.D.
Chicago, Ill.

It is a common mistake to suppose that the professional and the layman are two distinct groups, each with its own life and its own interests. In fact, they are two aspects of the same life, and their interests are inseparable. The professional is the one who is trained to deal with the facts of life, and the layman is the one who is trained to deal with the facts of life as they appear to him. Both are essential to the progress of the human race, and both are bound together by the same ties of sympathy and understanding. The professional is the one who is trained to deal with the facts of life, and the layman is the one who is trained to deal with the facts of life as they appear to him. Both are essential to the progress of the human race, and both are bound together by the same ties of sympathy and understanding. The professional is the one who is trained to deal with the facts of life, and the layman is the one who is trained to deal with the facts of life as they appear to him. Both are essential to the progress of the human race, and both are bound together by the same ties of sympathy and understanding.

out in bold relief. If it is a person or a group of people, he places them, or his camera in relation to them, so that the lighting on the scene will properly accentuate the faces and so that no detail of the background will intrude itself in the picture and detract from the faces.

Each scene should be as carefully considered as though it were a still photograph. Then whatever action is to take place in the scene should be planned beforehand so that it will take place within this frame and the camera will not have to be moved to follow it.

With all lenses of over two inches focal length, a sturdy tripod is advisable, for even the steadiest hand cannot avoid some movement of the camera. With telephoto lenses this movement is magnified in proportion to focal length. A good rule also in using long focal lenses is to use double speed where possible, especially when there are no people in the scene.

This halves the resulting camera movement but at the same time halves the speed of the action in the scene. There are various devices for use in place of the somewhat bulky tripod, such as the neat little one-legged device which telescopes and can easily be extended in the form of a walking stick. The camera is supported on this and rests against the body. Another device is the neck strap which provides fair steadiness when the camera is pressed down hard. Still another strap arrangement attached to the belt and the camera is steadied by being pulled up tightly. Any of these substitutes will serve well if the amateur uses care although the use of a tripod gives the best results.

If the camera must be tilted up or down during filming some purpose should be given to the tilt. Always try to tilt in a perfectly vertical direction and not on an angle. Then "panning" or tilting, always start at one end of the view and finish up at the most interesting part of the view.

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amateur movie maker is the unnecessary movement of the camera in filming. Note how little movement there is in the camera of the professional in the movie you are viewing. He "pans" or "tilts" only when absolutely necessary to follow action. If this were not true, most of the audience would get up and walk out of the theatre, for the eyestrain caused by camera motion is most annoying to many people, and to some, unbearable.

Camera steadiness in filming is the most important thing the beginner must learn, for the temptation to move the camera is very great. No matter how interesting your scene or how perfect your exposure, if the camera is moved about like a garden hose, your film will be worthless. Never "panoram" unless absolutely necessary to follow some moving object which cannot be photographed otherwise. If "panning" is unavoidable, do so slowly and steadily in an absolutely horizontal direction and never "pan" back and forth. Be careful in "pan" shots not to move the camera up and down.

Although a "panoram" shot is sometimes necessary, it is far better to take such scenes in a series of shots with the camera held still and pointed in only one direction until the scene is ended. Then complete the subject to be photographed with additional shots from other angles.

If the camera must be tilted up or down during filming some perpendicular scene or object, always try to tilt in a perfectly vertical direction and not on an angle. Then "panning" or tilting, always start at the least interesting end of the view and finish up at the most interesting

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or beautiful, then hold the camera still on this final composition long enough to have a complete scene of this position.

A good average scene, when the film is finally edited, should not run more than five or ten seconds. But for safety in editing and handling, it is well for the beginner to shoot his scenes a little longer than needed. (Sixteen millimeter film runs through the camera at normal speed at the rate of one foot in $2\frac{1}{2}$ seconds.) Though there are exceptions and there can never be any fixed rule for length of scene, many amateurs waste a great deal of film by making their scenes much too long. As rhythm is a very important item in filming, the length of scenes should vary somewhat like the meter in poetry. If a subject is sufficiently interesting to justify looking at it for any length of time, it is best to treat it in several scenes. Change the camera angle or make long, medium and close shots, either by moving up on the subject for each succeeding scene or by changing to a longer focus lens for a "close-up." Close detail shots are generally most interesting, but they must be "established" first by long or medium shots carefully timed.

In making very close shots with the average movie camera a condition known as "parallax" must be considered; the finder lens is beside or above the taking lens and hence what one sees in the finder is not exactly the same composition as will be exposed on the film. With cameras that are not provided with adjustment for parallax, one must be careful to make allowance for difference in level in order that the image of the object filmed will not be cut in half or off center.

LIGHTING - In black-and-white filming, flat lighting should always be avoided, for this spoils the perspective and modeling of the scene. Side, angle, and back lighting are most likely to give pleasing and artistic results, but in this connection, be sure the lens is properly shaded and

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that no direct or reflected sunlight falls on it. Often the sun shade on the lens is adequate for this purpose, but other means are sometimes necessary. However, be careful that whatever you use for shading the lens does not intrude into the scene unless it is a desirable overhanging branch far enough from the camera to be in sharp focus or some other composition which will enhance the beauty of your picture. Wherever possible in photographing scenes with plain cloudless skies, it is desirable to break the blank sky with an overhanging branch or some other suitable device.

Another important point to remember is that in photographing faces you must always try to have the background darker than the face. In outdoor photography the professional frequently lights up backlighted faces with a reflector, some large flat white surface such as a sheet or even a newspaper, placed so that it is outside the scene but picks up the direct rays of the sun and reflects them on the darkest side of the face. In interior filming by artificial light, the modeling of faces and objects is accomplished by the judicious placing of the lights. Excellent and inexpensive portable "photoflood" light holders are available. By their use interior filming is so simplified that the careful amateur may now obtain results favorably comparable to those of the professional.

PLANNING -- A very important point for the beginner to remember is that, whatever the subject, planned filming is indispensable for the best results. Plan beforehand just what each person in your scene will be doing. Above all have them do it naturally, even if you have to rehearse them again and again. If it is something more ambitious, plan the sequence of your scenes by a script or shooting schedule.

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VIOLIN - Although the processing laboratories will, at a very reasonable worth telling, plan accordingly. Make notes of little details which will make it more interesting, and picture them even if in scenes of only a second or two in length. Although it is desirable, when possible, to shoot these in sequence, this is not always necessary, for they can be rearranged later in editing. This means that, when the processing laboratory returns your film, you may cut it up by means of a splicer or one of the modern "film editors", rearrange the scenes, throw out any worthless parts or shorten scenes that are too long. Then the film may be spliced together either on the original reels or assembled on one larger reel to obviate interruptions when projecting.

SCRIPT The script should first be written as a general plan or rough outline, then rewritten with each scene numbered and its approximate length indicated, so that the finished film will be the right length. Explanatory titles should be indicated in their proper place and the whole story carefully studied and edited before any scenes are shot.

EDITING Most amateurs "get a kick" out of editing their own films. It is a simple process. Modern splicers are arranged to cut the film accurately into invisible splices and weld the overlapping ends with a special film cement. As it is not desirable to have many of these splices in a film which is to be projected, the sequences should be arranged, wherever possible, before filming. It is very important to keep a record of all scenes when shooting, numbering them according to your script, giving their footage and a full description, so that final editing will be simplified. A record of the diaphragm opening and filter used will be valuable if you must re-shoot scenes, for these records will enable you to correct your errors.

TITLING - Although the processing laboratories will, at a very reasonable cost, make titles of professional quality for both eight and sixteen millimeter amateur films, many beginners and most advanced amateurs prefer to make their own. There are several reasonably priced complete, and very ingenious titlers and "editors" on the market. Plain and fancy titles, trick titles, traveling titles, titles with pictorial backgrounds, all sorts of titles of professional quality and even animation and animated maps and cartoons can be made on these compact little devices. They are easy to operate, self-contained even to the lighting, and come with full instructions. All are supplied with letters of several sizes and can be used on an ordinary table top. In photographing titles it is no longer necessary to send them away for processing unless they are made in Kodachrome, for by the use of color-blind positive film, direct titles can be made and developed, and fixed and washed in a small circular tank at home, and dried on a small collapsible drum. By means of the editors and splicers mentioned above, you may splice in titles and make reels of film complete and ready for projection.

It is accepted practice that not more than 40% of the footage of the complete reel be used for titles. This means that a 400-foot reel, which is standard length for 16 millimeter films, should not contain more than 60 feet of title. Titles should be short, snappy, and explanatory.

FILM - Practically all "sub-standard" film is "reversible" and its purchase price includes finishing or processing. The purchaser returns the exposed undeveloped film to the place of purchase and in a few days receives the finished positive ready for projection. The original negative which was exposed in the camera has been developed, then reversed in a special solution

and converted into a positive, which is the form necessary for projection.

This method was adopted several years ago as simpler and less expensive for the amateur than the usual method of first making a negative and then making positive prints - known as the negative-and-positive method. In most instances the amateur requires but one copy, so it was deemed wise to save him expense by making his positive by reversal. With the reversal process, if one requires a number of duplicates, a negative is made from the finished positive and additional copies are made from this negative. The movie amateur need not greatly concern himself with brands of film as long as he selects the products of reputable manufacturers. But he should familiarize himself with the various types of film so that he can select the proper one for the scenes he is preparing to photograph.

All "sub-standard" film is coated on acetate or non-inflammable base, and it is the light sensitive emulsion on that base which determines the film's photographic qualities. There are five general classes: orthochromatic, regular panchromatic, superspeed panchromatic, color film and the color blind positive used principally for titles. For the average scene orthochromatic or ordinary film can be used with satisfaction, but for proper rendition of color values or for striking cloud effects, panchromatic film must be used. In poor light for interiors or where artificial lighting is used, supersensitive panchromatic film will give the best results. Supersensitive panchromatic film is generally rated as twice as fast by daylight and three times faster by artificial light than ordinary panchromatic. Recently a new and still faster film called Super XX Panchromatic has been placed on the market. It is four times faster than regular panchromatic. With this new film, all sorts of possibilities are open to the amateur. There is almost nothing beyond his reach photographically.

Every box of amateur movie film contains a leaflet giving valuable advice for judging exposures correctly for that particular type of film. Until you

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are thoroughly familiar with the different types, make a careful study of these instructions.

LIGHT FILTERS - Colored gelatine or glass light filters in suitable holders should be provided for each lens in your outfit. For black-and-white photography where panchromatic film is used, a two times yellow filter, a green and a red filter should be available. The red filter, when used with panchromatic film, cuts out practically all the blue light and renders very dark or black skies against which white clouds stand out strikingly. This is only one instance of that over-correction which, if not overdone, greatly improves photography. Over-correction should be used only where spectacular effects are desired. For all ordinary purposes, the yellow filter gives sufficient contrast between sky and clouds. The green filter is used where slightly more correction is required than that produced by the yellow filter. All these filters are marked with their proper light factors, showing what increase in exposure must be made to compensate for their use. In movie cameras which turn at a given speed, this exposure increase is achieved by enlarging the lens opening according to instructions. This should offer no difficulty to the careful amateur for all guess-work can be eliminated. Every movie maker should provide himself with a good exposure meter, preferably of the photo-electric type. These are expensive, but in the long run they will pay for themselves many times over by preventing the loss of valuable scenes which might otherwise be spoiled by incorrect exposure. In color photography, an exposure meter is indispensable.

EXPOSURE - You will note that every lens is listed as having a certain "f" value. This designates its speed and indicates the largest diameter to which the aperture of the lens can be opened and still give a well corrected picture. The "f" value is expressed not as a true diameter of the aperture but as a fraction of the focal length of the particular lens. A lens advertised or described as capable of working at "f:4.5" has a maximum dia-

and should be familiar with the following items, from a technical point of view:

[illegible]

~~1. The value of the χ^2 statistic is not a true measure of the goodness of fit. The value is expected to be a true measure of the goodness of fit only if the data are normally distributed. A test of the normality of the data is given in the Appendix.~~

phragm opening or "stop" which is $1/4.5$ of the focal length of the lens, For example, if a lens has a focal length of $4\frac{1}{2}$ inches, and is designed to work at $f:4.5$, then the diameter of the largest diaphragm opening or stop is 1 inch.

This does not mean that a lens is to be used exclusively at this large stop, but merely that it may be opened when necessary to such a size in order to admit enough light to give proper exposure. A rotating collar or flange around the barrel outside the lens is graduated in figures such as " $f:-1.9,-3.8,-4.5,-5.6,-6.3,-8.11-16-22$." Setting this collar with one of these numbers at the index line adjusts the iris diaphragm between the two elements of the lens to that size stop or aperture. The smaller the number of the stop, the larger the stop or opening and the more light admitted to the film in a given time. That is, $F:2.0$ is a larger opening than $f:4.5$, and $f:4.5$ is larger opening than $f:8$, and so on.

It is important to understand that the amount of light that a stop will admit to the film in a given time is not in proportion to the diameter of the opening, but to the square of the diameter. For example stop $f:16$ has a ratio just twice that of $f:11$, and thus in a given time $f:11$ will admit twice as much light to the film as will $f:16$. The ratio of light admitted in a given time with the various apertures is shown in the following table:

transmission of light" which is 1/100 of the focal length of the lens.
 For example, if a lens has a focal length of 10 inches, and is focused on
 an object at 100 inches, then the diameter of the largest diaphragm opening of lens is 1
 inch.

This does not mean that a lens is to be used exclusively as a light
 source, but merely that it may be used when necessary as such a light source.
 In other words, light is given proper exposure. A varying ratio of light
 source to image distance may be indicated in figures such as "1:100".
 1:100, 1:200, 1:400, 1:800, 1:1600, 1:3200, 1:6400, 1:12800, 1:25600, 1:51200, 1:102400, 1:204800, 1:409600, 1:819200, 1:1638400, 1:3276800, 1:6553600, 1:13107200, 1:26214400, 1:52428800, 1:104857600, 1:209715200, 1:419430400, 1:838860800, 1:1677721600, 1:3355443200, 1:6710886400, 1:13421772800, 1:26843545600, 1:53687091200, 1:107374182400, 1:214748364800, 1:429496729600, 1:858993459200, 1:1717986918400, 1:3435973836800, 1:6871947673600, 1:13743895347200, 1:27487790694400, 1:54975581388800, 1:109951162777600, 1:219902325555200, 1:439804651110400, 1:879609302220800, 1:1759218604441600, 1:3518437208883200, 1:7036874417766400, 1:14073748835532800, 1:28147497671065600, 1:56294995342131200, 1:112589990684262400, 1:225179981368524800, 1:450359962737049600, 1:900719925474099200, 1:1801439850948198400, 1:3602879701896396800, 1:7205759403792793600, 1:14411518807585587200, 1:28823037615171174400, 1:57646075230342348800, 1:115292150460684697600, 1:230584300921369395200, 1:461168601842738790400, 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<u>Stop</u>	<u>Ratio</u>
f:1.5	1
f:2	2
f:2.8	4
f:4	8
f:5.6	16
f:8	32
f:11	64
f:16	128
f:22	256
f:32	512

FOCUS - If we focus a lens accurately on a subject at 10 feet (or any other short distance away) only that subject will be in absolutely correct focus. Other objects closer or further away, say 9 or 13 feet, will not be in perfect focus and will appear slightly blurred or fuzzy in the photograph. Many times this blur or fuzziness may be so slight that you cannot see it with the naked eye, but in other instances it may be enough to be objectionable, and in still other cases the fuzziness, though not discernible in a small contact print, might be more in evidence in an enlargement. The depth of focus of a lens is the distance forward and back of the focused subject where the fuzziness will not be objectionable (a) for a contact print, and (b) for an enlargement of a given size. There are certain rules about this depth of focus:

1. The shorter the focal length of a lens, the greater will be the depth of focus.
2. The smaller the stop, the greater the depth of focus.
3. The further away the subject, the greater depth of focus. This information is useful only in explaining the principles of exposure, because in a motion picture camera the exposure is fixed; that is, at 16 frames to the second it is approximately 1/32nd of a second, at 8 frames it is 1/16th of a second, at 32 frames ultra speed, for slow motion scenes it is 1/64th of a second, and at 64 frames, for which some cameras are equipped, it is 1/128th of a second.

[illegible][illegible]

In normal operation of the camera the exposure is $1/32$ nd of a second, and we must use the diaphragm which is indicated for that exposure on the exposure meter. This should be changed only if the speed of the camera is altered for special effects.

NATURAL COLOR FILMS - Natural color filming has been so simplified by the introduction of the Kodachrome process that it is as easy, with a little care, to produce good natural color scenes as to film in black and white. This is the most appealing field for the average movie maker, for while the expense of the film, including processing, is slightly higher than that of plain filming, the results are infinitely more gratifying. Color filming opens up an entirely new world for the "sub-standard" camera. Subjects which would ordinarily be uninteresting take on a new meaning when re-produced in natural colors. Travel scenes live again on the screen in all their beauty; flowers, trees, birds, animals, people, skies, sea and mountains, all can be brought to the screen in lifelike reality. In color filming, the amateur is daily obtaining satisfactory results.

Color films do not allow so great a latitude in exposure as the ordinary panchromatic. With color the exposure must be hit "right on the nose," as one amateur puts it. As under-or over exposure cannot be corrected in processing as with black and white, accurate timing of exposure is imperative for perfect results. The instruction sheets which come with the film can be safely followed for general purposes, but one cannot expect to get consistently good results without the use of a photoelectric exposure meter. By the careful use of these meters, amateurs are consistently turning out almost perfect color films. Though color filming is simplicity itself, one should read articles and books on the subject, for aside from the technique of exposure and handling of the films, one must for really fine results, take into consideration the choice of subject, color composition,

It is the policy of the Government to provide for the maintenance of the national flag in the hands of the people and to encourage the use of the flag in the home and in the schools. The Government has taken steps to ensure that the flag is properly cared for and that it is not used in a disrespectful manner. The Government has also taken steps to ensure that the flag is not used in a manner that is inconsistent with the principles of the Constitution.

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the influence of the American process that it is an art, with a little
more, to produce more natural than nature as we find it in nature and with
this is the most surprising thing in the average movie maker, for while the
process of the film-making process, is slightly higher than that of
painting, the results are definitely more satisfying. Color films
show up as entirely new again for the "non-abstract" viewer. Subjects
which would normally be uninteresting take on a new meaning when re-
presented in color. Travel scenes live again as the scenes of all
their beauty; flowers, trees, animals, people, places, and
mountains, all are brought to the viewer in a new way. In color
films, the viewer is truly watching a new world.

[illegible]

color balance and lighting. While flat lighting with bright sunlight or ample flat incandescent lighting is recommended for the beginner, I have seen some remarkably beautiful and artistic films with side and even back lighting made by amateurs who take the trouble to give attention to the above details.

At present there are two types of Kodachrome film designed for either exterior or interior filming. Regular Kodachrome is intended for all exterior scenes in daylight, without a filter, but can be employed for interiors by using the special Kodachrome filter. Kodachrome Type A has been developed especially for use with photoflood lights. It cannot be used where there is even the slightest hint of daylight, because the picture will have an all-over blue fog which will spoil the true color effect. In an emergency this film may also be used with a special Kodachrome filter for outdoor scenes. In the purchase of Kodachrome film, make sure that the film is fresh and has not been in stock too long, for there is a tendency in old film to show an undesirable fog after processing. This result is also common if, after exposure, the films are held too long before processing. Kodachrome films may be made with any of the good "sub-standard" cameras, provided they are equipped with fast lenses.

Kodachrome 16 mm films may now be reproduced, that is, duplicate copies may be obtained at 10¢ a foot or \$40.00 for a 400 foot reel.

STORAGE - Provision has been made for the storage of home movie films by providing "humidor cans," and well-made and properly ventilated and humidified film storage safes are now available at little expense. Of course there is no fire hazard connected with the handling and storage of "sub-standard" films. The only precaution necessary is to see that they do not dry out too rapidly.

of distance and lighting. While flat lighting with bright sunlight or simple and incandescent lighting is recommended for the beginner, I have seen some remarkably beautiful and artistic films with side and even back lighting made by amateurs who take the trouble to give attention to the above details.

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BIBLIOGRAPHY - The following books can be purchased through any good photographic supply store.

Making Home Movies - Ottley
The Cine Amateur's Workshop - Ottley
How to Make Good Movies - Eastman Kodak Company
How to Expose Kodachrome - Eastman Kodak Company

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HISTORIOGRAPHY - The following books can be purchased through any

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